

## PHYSIOLOGICAL CHEMISTRY.

*Practical Physiological Chemistry; Junior Course; Senior Course.* By R. H. Aders Plimmer. Pp. 55 and 83. Privately printed. n.d.

"THIS book has been compiled as a handbook for practical work in Physiological Chemistry at University College. Much use has been made of the books by Milroy, Cole, Halliburton, Hofmeister and others, from which some pages have been adapted almost in their entirety."

The foregoing quotation from the preface shows that the work makes no attempt at originality. It is mainly a compilation from various sources of what a teacher considers most suitable in his own classes. Every teacher has his own ideas as to what a student in physiological chemistry should perform for himself; if any other teacher were to adopt Dr. Aders Plimmer's book as a guide in his practical classes, one anticipates that he would modify the arrangement, adding here, omitting there, and in still other places transposing parts from the junior to the senior course, and *vice versa*. The line between a junior and senior class is always difficult to draw, and every teacher has his own ideas as to what should be placed on either side of the line.

The book, from another point of view, is, however, different from all others hitherto published, for it includes the pure organic chemistry necessary for the understanding of the chemical problems of the physiologist and medical man. One of the difficulties of medical education to-day is the ever-increasing scope of the preliminary sciences, and the deciding as to how much of each is to be crowded within the few years of the curriculum. Science grows, but the years devoted to its study still have only 365 days each. The question is becoming an acute one as to which parts of each science the pruning knife must be applied. In the University of London, chemistry always has been, and still is, specially insistent on its claims; it has, moreover, been successful in obtaining an additional six months in the time devoted to it over and above the year that physics and biology are satisfied with. It is for this reason that so many teachers are anxious to see chemistry as a preliminary science cut down to the single year's work which suffices for the other subjects. Unfortunately, in many instances lecturers on chemistry, not having themselves had a medical training, know but little of what the students of medicine really need, and teach the subject as though their pupils hoped to be expert chemists. Such teachers point out the importance of chemistry as a groundwork of much that follows later in the course, but lose sight of the fact that a student has not done with chemistry when he passes his preliminary examination in science; he has later on in his studies to consider chemistry in its applications to both physiology and pathology.

In these circumstances it is not to be wondered at that the teachers of other subjects which have a more direct bearing on the study of medicine are urging that if the work of the pure chemist is limited to the one year, which they regard as ample for the

learning of the groundwork, the superstructure will later on have to include more physiological chemistry diluted to a suitable degree with those parts of organic chemistry which are absolutely necessary for its comprehension. As an earnest of what can be done with this object in view, Dr. Plimmer's book should meet with a hearty welcome.

W. D. H.

## CEMENT AND CONCRETE.

(1) *Portland Cement: its Composition, Raw Materials, Manufacture, Testing, and Analysis.* By Richard K. Meade. Pp. viii+385. (Easton, Pa.: The Chemical Publishing Co., 1906.) Price 14s. 6d. net.

(2) *Reinforced Concrete.* By E. F. Marsh and W. Dunn. Third edition, revised and enlarged. Pp. vii+654. (London: Archibald Constable and Co., Ltd., 1906.) Price 31s. 6d. net.

(1) THE author is chemist to the Dexter Portland Cement Co., and the analytical methods described have all been used to some extent in his laboratory. The treatise is a second edition of a small manual, published some four years ago, on the chemical and physical examination of Portland cement. In preparing this new edition, a considerable amount of fresh matter dealing with the manufacture of Portland cement has been added. The first two chapters, which form an introduction to the book, are devoted to the history of the development of the Portland cement industry in America; the growth in the total consumption, and the growth in the consumption per head of population, have both increased in a remarkable degree during the last sixteen years—in 1890 the total production in the United States was 335,000 barrels, and by 1904 this had increased to more than 26½ million barrels; but even in that year the consumption was in excess of the domestic production, and more than two million barrels had to be imported.

In the next section of the book, chapters iii. to viii., a comprehensive and complete account is given of the processes of manufacture; the raw materials are described in detail, and much information is given as to the localities in the States in which they are found, and one of the chapters is devoted entirely to the subject of quarrying and excavating the raw materials. In dealing with kilns and the burning of the raw materials, modern rotary kilns are described; this chapter will be found a very valuable one for reference purposes; the thermochemistry of the calcining is discussed in a very exhaustive manner. In connection with the description of the process of grinding, Mr. Meade not only explains the construction and working of the various ball and tube mills, which are now generally employed, but he gives plans and sections of the complete equipment of a modern Portland cement plant on the wet process plan and also on the dry process plan, with notes as to the cost of plant and manufacture.

The next section treats of the analytical methods

which are, or should be, employed in determining the quality both of the raw materials and of the finished product. This portion of the book will be very useful to chemists engaged in Portland cement factories, and to every analyst who may have to deal with the problem of determining whether or not a given sample of cement is up to the standard of some particular specification. The different methods employed are explained with great clearness, and the apparatus necessary is shown in well-drawn illustrations; so explicit are the instructions that an engineer who has had a fair training in the elements of chemical analysis could, should necessity arise, make many of these determinations for himself after procuring the necessary apparatus.

The last section of the book is devoted to the physical testing of Portland cement, and this section will be invaluable for reference purposes to the civil engineer and to other users of Portland cement. The author describes in turn all the ordinary physical tests, and his comments upon the various tests and their value in enabling a conclusion to be drawn as to the quality of any given sample are of much practical value.

(2) The first edition of this work appeared in the autumn of 1904, and since that date there has been such great progress in the employment, and in our knowledge, of reinforced concrete that a new edition was rendered imperatively necessary; much new matter has been added in addition to a general revision of all the portions of the book dealing with calculations. Reinforced concrete is still not used in this country to anything like the extent to which it has been employed both in America and on the continent of Europe, but much of the opposition to its use is now steadily declining.

The first three parts of the book are devoted to a general description, with excellent illustrations, of the various systems which have been employed up to the present date, and give a brief account of the materials, including both concrete and the reinforcing metal. Great stress is laid on the absolute necessity of employing only the best material in connection with the concrete, and of ensuring that the materials shall be of uniform quality and the concrete well and carefully made.

Part iv. deals with the practical construction of reinforced concrete for various purposes, and the construction of the necessary moulds for beams, floors, arched ribs, chimney shafts, pipes, sewers, and reservoirs. The next two sections are devoted to a very full and complete account of the experimental researches, and the data deduced therefrom, which form the basis of all calculations necessary in designing reinforced concrete; the authors are to be congratulated on the admirable way in which they have brought together, in a most convenient form for reference, information scattered through a very large number of publications, and on the complete way in which they have brought up to date all the data obtained in experimental investigations. The chapter devoted to calculations necessary in design work has been almost entirely re-written and very considerably

simplified, with great advantage to the designer who may desire to consult this work, the method of treatment adopted for the case of singly reinforced rectangular and T beams being entirely new.

The last section of the book, as in the earlier editions, is devoted to a descriptive account of various buildings and structures which have been erected up to the present time in reinforced concrete; this chapter contains a series of most admirably reproduced photographs of many large buildings and handsome arched bridges built entirely on this system.

The regulations which have been laid down by the Prussian Government for the employment of reinforced concrete in buildings are printed in *extenso* in appendix ii., and another appendix contains the report of the experiments carried out by the United States Geological Survey Department on the permeability of reinforced concrete pipes.

The present edition is a great improvement on previous issues, and every engineer and architect who utilises reinforced concrete on anything like a large scale in his constructional work will find this book an indispensable addition to his reference library.

T. H. B.

#### BOOKS ON ELEMENTARY BOTANY.

- (1) *Principles of Botany*. By J. M. Bergen and B. M. Davis. Pp. ix+555. (Boston, U.S.A., and London: Ginn and Co., n.d.) Price 6s. 6d.
- (2) *Introduction to Plant Ecology for the Use of Teachers and Students*. By Rev. G. Henslow. Pp. x+130. (London: E. Stanford, 1907.) Price 2s. 6d.
- (3) *An Introduction to Practical Botany*. By E. H. Davies. Pp. x+127. (London: J. M. Dent and Co., 1906.) Price 2s.
- (4) *The School Garden. A Handbook of Practical Horticulture for Schools*. By J. E. Hennessey. Pp. 155. (London: Blackie and Son, Ltd., 1906.) Price 1s.
- (5) *Flowers Shown to the Children*. By J. E. Kelman and C. E. Smith. Pp. xii+154. (London and Edinburgh: T. C. and E. Jack, n.d.) Price 2s. 6d. net.

(1) IN the "Principles of Botany" the authors have introduced an innovation that offers definite advantages, and promises to be as suitable for practical work as for lecturing. The book is apportioned into three sections; the first comprises the morphology and physiology of the seed-plant taken in combination; classification and comparative morphology of cryptogams and phanerogams are treated in the second portion; and ecology, with a short reference to economic botany, forms the final section. As a result, only those morphological facts are noted in the first section that are required to explain the construction of the plant as a living entity, and much detail is appropriately transferred to ecology. Whilst most favourably impressed with the book in its entirety, the taxonomic portion, that more particularly demands judicious selection and